Idaho Power

NIAGARA SPRINGS HATCHERY

ANNUAL REPORT

1985 Steelhead Brood Year

by

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ABSTRACT

Niagara Springs Hatchery received almost three million 1985 Brood Year (BY) steelhead eggs and fry. Survival to planting size was 692. A total of 2,010,493 steelhead weighing 339,885 pounds were stocked during the season.

In November of 1985, 330,520 A-strain steelhead fingerlings weighing 12,950 pounds were transported from Niagara Springs Hatchery to the Snake River below Hells Canyon Dam. In April and May of 1986, another 819,495 steelhead smolts weighing 162,430 pounds were transported to the Hells Canyon site. Releases to Panther Creek totaled 246,440 smolts weighing 44,905 pounds. Another 614,038 smolts weighing 119,600 pounds were released into the Pahsimeroi River. Spring releases totaled 1,679,973 smolts weighing 326,935 pounds.

A total of 581,000 pounds of fish feed was fed to produce 339,885 pounds of fish, resulting in a conversion of 1.17. Total feed costs including medicated feed was $ 141,077, for a cost of 0.41 cents per pound of fish produced.

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INTRODUCTION

Niagara Springs Hatchery, one of America's largest privately owned steelhead rearing facilities, lies 10 miles south of Wendell, Idaho, in the Snake River Canyon. Operated by Idaho Department of Fish and Game personnel, the hatchery is owned and financed by Idaho Power Company as part of their multimillion dollar fish program provided under terms of the Federal Energy Regulatory Commission license for the Hells Canyon hydroelectric complex. Its purpose is to preserve a run of anadromous steelhead trout in the lower Snake River below Hells Canyon Dam, and to relocate a portion of that run to the Salmon River Drainage.

The hatchery receives water from Niagara Springs (located above the hatchery) at a constant temperature of 58°F. Fourteen raceways and 20 circular vats require up to 130 cfs of water for operations. Spring water is available for domestic use, and also for the irrigation of 10 acres of lawn and park.

The hatchery features a 30 feet x 90 feet building that includes an office, two incubator rooms, a storage room, a small shop, a garage, and three restrooms. A smaller building is used for storage. Another building is used to house a 20-ton refrigeration unit to chill water for hauling steelhead. The hatchery has three wooden-framed homes, and one mobile home for housing four permanent employees.

OBJECTIVES

1. To rear 200,000 pounds of steelhead smolts to be released into the Pahsimeroi River in the Salmon River Drainage.

2. To rear 200,000 pounds of steelhead smolts to be released into the Snake River below Hells Canyon Dam.

FISH PRODUCTION

Between April and May of 1985, 1,017,152 eyed eggs were received from Pahsimeroi Hatchery, and another 1,582,340 were shipped from the Oxbow facility. These eggs were all from A-strain steelhead. An additional 315,000 fry, which were from the same source as the *eyed* eggs, were provided from Pahsimeroi Hatchery.

Eggs were disinfected for 30 minutes with a 100 ppm iodine solution, measured, and placed in upwelling incubators that are capable of holding 120,000 eggs. After the eggs hatched, the rate of flow through the upwelling incubators was increased to the maximum of 20 gpm while the sac fry grew. As sac fry began to swim-up, they overflowed into vats (34 inches deep and 6 feet in diameter. A density index of 0.5 was reached

before the fry were to the swim-up stage, but due to limited nursery space, fry remained in vats for about 3 to 4 weeks before moving to raceways outside. When the desired raceway density index of 0.5 was reached, fish were extended to their final rearing capacity with a water flow of approximately 7 cfs per raceway.

Fish were fed using Piper's hatchery constant method. Fry were fed 10 times per day until they reached 30 per pound when the number of feedings per day decreased to 6. Feed sizes were adjusted according to fish growth using past hatchery records and feed manufacturer's recommended levels.

Fourteen Nielsen fry feeders are used during early rearing while an electrically powered bridge spanning all fourteen raceways with Nielsen feeders attached is used to feed fish in the large raceways. This allows the entire hatchery to be fed simultaneously, and thus is an efficient labor-saving device.

The hatchery fed 581,000 pounds of feed at a cost of $141,076.94 to produce 339,885 pounds of fish (does not include hauling mortality) for an overall conversion of 1.71 and a cost of 0.41 cents per pound of fish (Appendix A). Of the 581,000 pounds of feed used, 109,020 pounds was medicated feed, costing $46,464.54. Furunculosis (Aeromonas salmonicida) had a detrimental effect on the conversion, and was the main reason for loss of production in November, January, and March. Steelhead seemed to develop a progressive distaste for Romet 30, eating it readily in July but developing a definite dislike for it by January. Feeding rates were reduced to avoid wasting feed. All feed was purchased from Rangen, Inc., in Buhl, Idaho.

Raceways were swept daily, with waste removed by a gravity flow pipe discharging into the settling pond. One broom was used for each raceway to prevent disease transmission, and twice a week all brooms were disinfected. Headscreens were cleaned at least twice per week, and more often when necessary. Inflow bars and raceway inflow gaps were checked daily to assure maximum flows. Flows were adjusted monthly while fish grew until a maximum flow of 93 cfs was attained.

Furunculosis was the only significant disease problem affecting this group of fish. Production was limited by repeated outbreaks, which were cyclic: usually occurring about 35 days apart.The first outbreak occurred in July with over 92,000 fish lost.The entire hatchery was treated with Romet 30 for 5 days. Mortality declined slightly, and then began to increase. Romet 30 was fed again, this time for 10 days. Mortality decreased considerably, and no unusual losses were noted until the first week in September when mortalities increased. Furunculosis was confirmed, and the raceway was treated for 10 days using Romet 30. The next outbreak occurred during the first week in October, infecting all the raceways. Romet 30 was again administered for 10 days.This treatment worked very well, and mortalities decreased over 90% within 10 days after initial treatment.Mortalities were approximately 238,000 fish, nearly 3.5 times greater than last year's losses to the same disease (Table 1).

Table 1. Survival by life stages of A-steelhead at Niagara Springs for BY 1985.

	Eyed eggs received plus fry	Hatched	Moved outside	Clipping time	Fish released
Numbers	2,914,492	2,768,767	2,702,317	2,646,602	2,010,493
Percent lost	0	5	2.28	1.9	21.8
Cumulative	0	5	7.28	9.2	31[a]

[a]Furunculosis was main cause of mortalities from September through March.

Furunculosis continued to cause problems during November, January, and March. Each time, fish were treated with Romet 30 for 10 days. During the last two outbreaks, the treatment period was extended to 12 days in order for the fish to ingest enough drug. Conversion and growth rates were very poor during this time.

Prophylactic treatments of benzelchonium chloride were administered during September when fish were fin clipped to cure gill problems during October. Viral samples were taken on July *2* and February 22. Results from both samples were negative. Fish from the supply pond were examined and also found to be negative.

From eyed eggs received to fish released, mortality numbered 432,205 in the Hells Canyon stock. In addition, 17,086 fish were lost during transportation, resulting in an overall mortality rate of 28.2 percent. Mortality in the Pahsimeroi stock totaled 471,794 (35.4X). Average mortality for both groups was 31.62.

On October 10, 1985, 120 steelhead fingerlings were hauled to Panther Creek for EPA heavy metals research. After fish were adipose fin clipped and split, an excess of 330,520--containing 40,050 coded wire-tagged fish--was hauled to Hells Canyon on November 13 and 15, 1985. They were 4.70 inches in length and weighed 25.5 per pound when stocked.

Steelhead smolts transported in the spring of 1986 averaged 7.86 inches, and were 5.14 fish per pound (Table 2). Total steelhead smolts released in the spring of 1986 numbered 1,679,973 and weighed 326,930 pounds. Unfortunately, 17,086 Hells Canyon smolts weighing 3,437 pounds were lost to mechanical failure on one of the tankers. The total number of steelhead produced during the BY 1985 production season (including hauling mortality) was 2,027,579 fish weighing 343,322 pounds.

FISH MARKING

Fin Clipping

In order to protect "wild" steelhead in Idaho, fishermen are not allowed to keep wild fish. For fishermen to differentiate between "wild" and "hatchery" steelhead, all hatchery steelhead have their adipose fin removed. During September 9 to September 25, 1985, 2,291,814 steelhead were adipose fin clipped by a crew of 38 people. Mortality resulting from this project totaled 10,429, or 0.46% (Table 3). Funding for this project was provided by Bonneville Power Administration.

Coded Wire Tagging

To evaluate release sites and hatchery contribution, a coded wire tagging program was initiated. Funded by Idaho Power Company, this program has been very successful at Niagara Springs Hatchery. A total of 152,040 steelhead received coded wire tags. There were 81,715 fish tagged

Table 2. Release sites, dates, sizes, numbers, and pounds released for A-strain steelhead smolts reared at Niagara Springs Hatchery and released in the spring of 1986.

Stock	Release site	Release date	Number released	Size (#/lb)	Total length	Pounds released
Pahsimeroi	Panther Creek	10/10/85	120	25	3.97	4.8
Hells Canyon	Snake River, Hells Canyon	11/13 & 11/15/85	330,520	25.5	4.7	12,950
Pahsimeroi	Pahsimeroi below trap	3/24/86 to 4/5/86	614,038	5.13	7.86	119,600
Pahsimeroi	Panther Creek	4/5 to 4/9/86	246,320	5.42	7.72	44,900
Hells Canyon	Snake River, Hells Canyon	4/15 to 5/2/86	819,495	5.05	7.91	162,430
Totals						
Pahsimeroi	Salmon River Drainage	10/10/85 & 3/24 to 4/9/86	120 860,358	25 5.23	3.97 7.82	4.8 164,500
Hells Canyon	Snake River Hells Canyon Dam	11/13/85 & 4/15 to 5/2/86	330,520 819,495	25.5 5.05	4.7 7.91	12,950 162,430
Grand totals			2,010,49			339,885[a]

[a]Does not include hauling mortality.

Table 3. Fin clipping summary for Niagara Springs Hatchery, September 1985.

Fish					
Estimated number	Actual number	Percent accuracy	Clipping mortality	Percent mortality due to clipping	Raceway number
343,182	297,751	86.76	2,408	0.81	1
260,655	194,303	74.54	710	0.37	3
315,370	284,170	90.1	332	0.12	5
188,657	198,330	105.13	465	0.23	6
427,318	372,950	87.28	1,809	0.49	7
388,527	330,680	85.11	2,550	0.77	9
374,119	321,190	85.85	1,599	0.50	11
348,774	292,440	83.85	556	0.19	13
2,646,602	2,291,814	86.59	10,429	0.46	

during October; 40,050 were released in November 1985, and 38,679 were released in April 1986, into the Snake River below Hells Canyon Dam. In addition, 70,325 fish were tagged in March, with 37,812 released into the Pahsimeroi River in April, and 29,812 released into Panther Creek the same month. All coded wire-tagged fish received a left ventral clip for fishermen and biologists to identify marked fish (Table 4).

Freeze Branding

Steelhead were also freeze-branded to be identified for outmigration studies. This project was funded by Bonneville Power Administration for the Fish Passage Center. These fish from Hells Canyon stock were freeze-branded with a "T" on the right side of the fish below the dorsal fin in the "2" position. These freeze-branded fish were released below Hells Canyon Dam at the end of April 1986, and numbered 51,328 (Table 4).

SPECIAL STUDIES

Initial Feeding Date Study

Work was continued on this study to determine if a delayed initial feeding date would lead to a more uniform size at the time of shipping, and a lower mortality rate among fry. It was determined that by delaying feed until 90% of the fry were swimming up, mortality was reduced 29% during the first 6 weeks of life, and diversity in size of smolts was much reduced. This research will hopefully be published this year.

HATCHERY IMPROVEMENTS

Several improvements occurred at the station over the past year. A flow meter was installed that will to record daily water flow through the hatchery. The interiors of residences No. 1 and No. 2 were painted. Rock and soil were added to the inflow dam to prevent seepage. New window blinds were installed inside the hatchery office. A dewatering tower was built for the fish pump to assist loading transports from our bridge and to aid fin clipping; now fish are pumped instead of carried to the clipping trailer. We replaced all 2 inch x 4 inch raceway dam boards with new 2 inch x 8 inch boards to increase water depth and to assist in cleaning.

Equipment additions included a new table saw and an IBM personal computer. The table saw has helped tremendously in the construction of screens, shelves, and bookcases, and is much safer than the old one. The computer has been an invaluable tool in improving the efficiency of this hatchery. Efficiency will improve as proficiency with the computer increases.

Table 4. Coded wire tagging summary for Niagara Springs Hatchery for Brood Year 1985-1986. All released steelhead were adipose and left ventral fin clipped.

Tag or brand	Numbers marked	Mortality to release	Release site	Date of release	Number released	Average size
CWT# 10/28/40	40,371	321	Snake River, Hells Canyon	11/13/85	40,050	4.7 in
CWT# 10/28/16 & 10/28/17	39,496	1,684	Pahsimeroi river trap	4/1-3/86	37,812	7.66 in
CWT# 10/28/18	30,829	1,017	Panther Creek	4/5, 6, 7/86	29,182	7.69 in
CWT# 10/28/41	41,344	2,665	Snake River Hells Canyon	4/21, 22 & 4/29, 30/86	38,679	8.30 in
Freeze branded (R.D. T-2)	52,264	936	Snake River Hells Canyon	4/25, 28, 29 & 5/2/86	51,328	7.93 in
Totals	204,304	6,623			197,681	

A concrete dam will eventually be installed at the hatchery intake to prevent seepage. An expanded nursery area for early rearing would make the hatchery more reliable. This could be accomplished by extending the center walls of the present nursery raceways, or by building portable screens to be placed in upper sections of large raceways. The existing pavement needs resurfacing, and speed bumps should be installed. A security fence is needed immediately around the intake pool to keep bathers and fishermen out, and to eliminate disease transmission. A garage for Residence No. 4 would make storage space more equitable for all permanent employees.

All fish should be kept out of the water supply to minimize disease. This should include periodic removal by shocking the intake pool, headrace, and springs where possible. Enclosing the spring or treating the water source are other possibilities.

ACTIVITIES AND STAFF

The hatchery crew gave many tours this year, mostly during the summer. School groups, scouts, religious groups, and out-of-state visitors were shown our slide presentation and taken through the facility. There were 74,989 visitors at the park and the hatchery last year. In addition, the crew assisted in fish and game law enforcement, check stations, and deer depredation.

Once again, numerous staff changes occurred at Niagara Springs Hatchery. In September, Joe Chapman replaced Mike Stoddard, who was promoted to Hatchery Superintendent I at the Grace Hatchery. In December, Chris Starr was promoted to Hatchery Superintendent I at McCall Hatchery. Chris was replaced by Todd Garlie in January. Arnie Miller was promoted to Hatchery Superintendent I in April after Steve Dillon resigned and moved to Arizona. Jerry Mowery remained as Hatchery Superintendent III.

APPENDIX A
FISH FEED REPORT
1985-1986

Fish feed size	Manufacturer	Cost/pound	Pounds	Cost	Tax	Total
Regular Feed						
Starter	Rangen	0.3063	1,500	459.45	18.38	477.83
No. 1	Rangen	0.3063	2,800	857.64	34.31	891.95
No. 2	Rangen	0.3063	6,000	1,837.8	73.51	1,911.31
	Rangen	0.2876	3,600	1,035.36	41.4144	1,076.77
No. 3	Rangen	0.2876	23,550	6,772.98	270.92	7,043.90
No. 4	Rangen	0.2042	63,530	12,972.82	518.91	13,491.74
	Rangen	0.2092	9,000	1,882.8	75.312	1,958.11
Coarse crumbles	Rangen	0.2042	42,690	8,717.298	348.69	9,065.99
3/32 pellet	Rangen	0.1956	20,380	3,986.328	159.45	4,145.78
1/8 pellet	Rangen	0.1666	43,400	7,230.44	289.22	7,519.66
	Rangen	0.1752	234,940	41,161.48	1,646.46	42,840.86
	Rangen	0.1956	20,590	4,027.404	161.10	4,188.50
Totals		0.237058	471,980	90,941.80	3,637.67	94,612.40
Medicated Feed						
No. 1	Rangen	0.4026	150	60.39	2.42	62.81
No. 4	Rangen	0.5507	15,550	8,563.385	342.54	8,905.92
3/32 pellet	Rangen	0.4006	2,500	1,001.5	40.06	1,041.56
	Rangen	0.3956	20,950	8,287.82	331.51	8,619.33
1/8 pellet	Rangen	0.393	30,850	12,124.05	484.96	12,609.01
	Rangen	0.3752	39,020	14,640.30	585.61	15,225.92
Totals		0.419616	109,020	44,677.44	1,787.10	46,464.54
Regular and Medicated totals			581,000	135,619.2	5,424.7	141,076.94

APPENDIX B
PRODUCTION RECORD
NIAGARA SPRINGS STEELHEAD HATCHERY
1969-CURRENT

Production season	Egg total	Total mortality	Percent loss	Number released	Pounds released	Feed conversion
1969-1970	3,405,422	649,514	19.07	2,755,908	299,235	1.68
1970-1971	2,835,608	534,646	18.85	2,300,962	201,778	1.9
1971-1972	2,139,903	369,228	17.25	1,770,675	235,375	1.69
1972-1973	10,670,485	5,904,134	55.33	4,766,351	169,667	1.57
1973-1974	4,926,374	4,926,374	100.00	1,973,120	187,276	1.96
1974-1975	3,440,242	2,067,449	60.10	1,372,793	167,493	2.1
1975-1976	2,286,537	595,642	26.05	1,690,895	247,855	1.77
1976-1977	3,218,686	1,643,985	51.08	1,574,701	251,732	1.8
1977-1978	3,151,858	2,140,918	67.93	1,010,940	131,000	2.8
1978-1979	2,489,419	1,116,865	44.86	1,372,554	243,920	2.6
1979-1980	2,747,239	1,300,959	47.36	1,650,840	309,000	1.79
1980-1981	2,195,426	720,172	32.80	1,475,254	316,330	1.96
1981-1982	2,302,370	953,015	41.39	1,349,355	374,350	1.93
1982-1983	2,929,527	1,794,387	61.25	1,135,140	181,150	1.9
1983-1984	3,459,008	1,849,313	53.46	1,609,695	310,000	2.04
1984-1985	2,932,164	706,071	24.08	2,318,393	314,650	1.72
1985-1986	2,914,492	903,999	31.02	2,010,493	339,885	1.71
5-year average	2,907,512	1,241,357	43.71	1,684,615	304,007	1.86
Overall average[a]	3,319,899	1,453,144	40.74	1,885,309	255,839	1.94

* 1973-1974 data was not used in the overall average due to complete loss that year. After removing all fish and disinfecting, fish were brought in from Dworshak National Fish Hatchery to rear and eventually release.

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